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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER YANG, JIE				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/528,263

Applicant(s)

NAGAO ET AL.

Examiner

JIE YANG

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5, 6 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6 and 8-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/17/2009 has been entered.

Status of the Claims

Claims 4 and 7 have been cancelled; claims 3, 5, 6, 10-12, and 15-17 have been amended; and claims 1-3, 5, 6, and 8-18 remain for examination. Claims 1, 8, 13, and 18 are independent claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 6, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda et al (US 6,372,056 B1, thereafter US'056).

Regarding claims 1 and 18, US'056 teaches a spring steel which is superior in both shaving properties and green drawing properties (Abstract of US'056). The comparison composition is listed in the following table. All of the basic composition ranges and optional elements ranges disclosed by US'056 overlap the composition ranges of the instant claims, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the claimed compositions of C, Si, Mn, P, S, and optionally adding Ti and/or Nb from the composition disclosed by US'056 because US'056 discloses the same utility throughout the disclosed ranges.

Element	From instant Claims 1 and 18 (in wt%)	US'056 (in wt%)	Overlapping range (in wt%)
C	0.6-1	0.38-0.85	0.6-0.85
Si	0.1-0.85	0.25-2.1	0.25-0.85
Mn	0.3-1.0	0.2-1.0	0.3-1.0
P	0.01 or less	0.035 or less	0.01 or less
S	0.02 or less	0.035 or less	0.02 or less
Claim 3			
Cr	0.3 or less (optional)	0.65-1.5 (optional)	--
Ni	0.3 or less (optional)	0.2-0.5 (optional)	0.2-0.3
Claim 4			
Nb,V,Ti,Tf,Zr	At least one: 0.1 or less	Ti: .02-.09; Nb:0.2-5	Ti:0.02-0.09; Nb:0.02-0.1
Fe	Balance	Balance	Balance

US'056 teaches 8.0 mm in diameter wire rod (Col.5, line 31- col.6, line 12 of US'056) with essentially one of a pearlite structure and a combination of ferrite and pearlite structure,

and has a fraction of supercooled structure less than 10% (Claim 4 and table 2 of US'056), which reads on the limitation of not less than 90% of said wire rod in area percentage being composed of a pearlite structure as recited in the instant claim and overlaps the ranges of 5.0 mm or more in diameter size of wire rod as recited in the instant claims. US'056 further teaches a rolled spring steel superior in workability with tensile strength less or equal to 1200 MPa; and reduction of area between 30% and 70% (Abstract and Fig. 1 of US'056), which overlaps the tensile strength (disclosed in table 1, 3 and 5 of instant application), and reduction of area as recited in the instant invention.

Regarding the equation (1) in the instant claims 1 and 18, it fully depends on the composition ranges of C, Mn, and Si. US'056 teaches the alloy composition ranges overlapping the composition ranges of the instant invention and US'056 teaches an alloy having a similar essentially pearlite structure as recited in the instant invention as discussed above (Claim 4 and table 2 of US'056). It is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D.357, 553 O.G.177; 57 USPQ 117, Taklatwalla v.Marburg.

620 O.G.685, 1949 C.D.77, and In re Pilling, 403 O.G.513, 44 F(2) 878, 1931 C.D.75. In the instant case, in the absence of evidence to the contrary, the selection of the proportions of elements of C, Mn, and Si would appear to require no more than routine investigation by those ordinary skilled in the art. (See In re Austin, et al., 149 USPQ 685, 688).

US'056 discloses 30 cm long test pieces (Col.6, line 13-16 of US'056), which is different from 4 m length recited in the instant claims. However, the length is an obvious variable for drawability test. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a suitable length, for example, 4 m wire rod to do drawability test.

US'056 does not explicitly state the standard deviation of tensile strength less than or equal to 30 MPa, and standard deviation of reduction of area less than or equal to 4%. However, US'056 teaches that the standard deviation of Vickers hardness measurement is smaller than 20, preferably less than 15 (col.4, line 1-12). The standard deviation of Vickers hardness measurement is equivalent to standard deviation of tensile strength measurement or standard deviation of reduction of area in the sense of the microstructure uniformity of materials

because the uniform microstructure would lead to less variation of mechanical properties, for example, hardness, tensile strength, and reduction of area. The above discussion is supported by US'056 (Col.4, line 1-12 of US'056). See MPEP 2144.06.

Regarding claim 3, US'056 discloses 0.2 to 0.5 weight percent Ni, which overlaps the range of 0.3 or less mass percent Ni as in the instant claim (Claim 2 of US'056).

Regarding claims 5 and 6, the recitation "N is controlled to 0.01% or less N"; "Al and Mg are controlled to 0.05% or less and 0.01% or less, respectively" include "0" mass percent N, Al and Mg respectively. US'056 does not specify wherein the alloy would contain N, Al and Mg. Therefore, US'056 inherently satisfies these limitations.

Regarding the limitation of "consisting essentially of" in the instant claims 1, 3, 5, and 6, all of the basic composition ranges and optional elements ranges disclosed by US'056 overlap the composition ranges of the instant claims, which reads on the limitation of "consisting essentially of" as recited in the instant claims.

Claims 1 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (NPL: Drawing high-grade steel wire rods without heat treatment" wire journal international, Vol. 16, XP008063056, pp. 236-247, Sept. 1983, thereafter, NPL-1).

Regarding claims 1 and 18, NPL-1 teaches a high grade steel wire rod without heat treatment (Title of NPL-1) with the composition ranges (Table 2 of NPL-1) within the composition ranges of alloy as recited in the instant claim. NPL-1 teaches the rod has 5.5 mm to 50 mm diameter (Page 236, Col.2, 2nd paragraph to page 237, 1st paragraph); NPL-1 teaches major pearlite microstructure in the alloy; NPL-1 teaches tensile strength, reducing area, deviation of tensile strength, and deviation of reducing area (Table 4, 6, Fig.7-9 of NPL-1), which reads on the corresponding limitations in the instant claims.

Still regarding claim 18, which includes the similar limitations as disclosed in claim 1 except including: performing a first cooling of the wire rod at an average cooling rate of 8 to 20°C/sec in the temperature range of from 900 to 670°C; and performing a second cooling of the wire rod at an average cooling rate of 1-5°C/sec in a temperature range of from 670 to 500°C, which are process limitations in a product-by-process claim. In the absence of structural characteristics imparted by the claimed process limitations, the claimed process limitations

would not add patentable weight to the present titanium alloy bolt claims. MPEP 2113 R1. The Examiner notes that NPL-1 further teaches the two similar cooling steps (Fig.2 and 4 of NPL-1) as recited in the instant claim 18.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'056 in view of Tsukamoto (US 5,156,692, thereafter US'692).

US'056 does not explicitly state that the average diameter of nodules in said pearlite structure is 10 μm or less. US'692 teaches a process for manufacturing steel wires for use in wire drawing, and particularly steel wires which are subsequently subjected to final wire drawing to form steel filaments which are used in the manufacture of steel cord wires (Col.1, line 6-10). US'692 teaches the resulting pearlite has a pearlite block size of not greater than 5.0 μm , which is in the range of 10 μm or less nodules diameter of pearlite structure recited in the instant claim. US'692 teaches similar composition alloy (Col.7, line 21-25 of US'692), with similar fine pearlite structure (Col.3, line 16-27 of US'692), for the same steel wire drawing application (Col.1, line 6-10) as the instant invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to obtain a fine

pearlite grain size (or be called pearlite blocks), for example, less than 10 μm as demonstrated in US'692 in the process of US'056 to improve drawability of the steel wire (Col.3, line 15-27 of US'692).

Claims 8, 10-13, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'056 in view of Bae et al (US 6,264,759 B1, thereafter US'759).

Regarding claims 8 and 13, which include the similar limitations as disclosed in claim 1 except including B: 0.001 to 0.005wt%. US'056 is applied to the instant claims for the same reason as the rejection for the instant claim 1. US'056 does not explicitly state the alloy for a wire rod further contains B: 0.001 to 0.005%. US'759 teaches a method for manufacturing wire rods for using in making bead wires, wire ropes and spring (Abstract of US'759). US'759 teaches a wire rod alloy with major composition ranges (claim 1-4 of US'759) overlapping with the composition ranges recited in the instant invention. US'759 teaches B content should be preferably limited to 10-30 ppm (Col.5, line 55-64 of US'759). This B composition range is within the range of 0.001 to 0.005%wt. B as recited in the instant claims. US'795 teaches a similar composition alloy, with the similar degenerated pearlite structure for making the same

high strength steel wire (Col.3, line 29 to col.4, line 26 of '759) as the instant invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 0.001 to 0.005*wt. of B as disclosed by US'759 in the alloy of US'056 to reinforce the hardenability of the steel to inhibit the formation of ferrite (Col.3, line 51-60 of US'759).

Regarding claims 10-12 and 15-17, which depend on claims 8 and 13, respectively, US'056 in view of US'759 teaches the limitations of claims 8 and 13. US'056 discloses 0.2 to 0.5 weight percent Ni, which overlaps the range of 0.3 or less mass percent Ni as in the instant claims 10 and 15 (Claim 2 of US'056). Regarding the limitations: "N is controlled to 0.01% or less N" (claims 11 and 16); "Al and Mg are controlled to 0.05% or less and 0.01% or less, respectively" (claims 12 and 17), which include "0" mass percent N, Al and Mg respectively. US'056 does not specify wherein the alloy would contain N, Al and Mg. Therefore, '056 would inherently satisfy these limitations.

Regarding the composition ranges: Si 0.1-0.85wt% and P: 0.01 or less as recited in the instant claims, which is the same limitation as claimed in the instant claims 1. The Examiner's position can refer to the rejection for the instant claim 1.

Regarding the limitation of "consisting essentially of" in the instant claims 8, 10-13, and 15-17, the transitional language "consisting essentially of" will be constructed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355. If an applicant contends that additional steps or materials in the prior art are excluded by the recitation of "consisting essentially of," applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention. In re De Lajarte, 337 F.2d 870, 143 USPQ 256 (CCPA 1964). See MPEP 2111.03. In the instant case, the applicant has not provided evidence to show that the introduction of the additional binder material, for example B 0.001 to 0.005wt% would materially change the characteristics of applicant's invention.

Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'056 in view of US'759, and further in view of US'692.

Regarding claims 9 and 14, which depend on claims 8 and 13, respectively, US'056 in view of US'759 teaches the limitations of claims 8 and 13. US'056 does not explicitly states alloy for wire rod wherein the average diameter of nodules in said

pearlite structure is 10 μm or less. US'692 teaches a process for manufacturing steel wires for use in wire drawing, and particularly steel wires which are subsequently subjected to final wire drawing to form steel filaments which are used in the manufacture of steel cord wires (Col.1, line 6-10 of US'692). US'692 teaches the resulting pearlite has a pearlite block size of not greater than 5.0 μm , which is within the range of 10 μm or less nodules diameter of pearlite structure recited in the instant claims. US'692 teaches a similar composition alloy (Col.7, line 21-25 of US'692), with the similar fine pearlite structure (Col.3, line 16-27 of US'692), for the same steel wire drawing application (Col.1, line 6-10 of US'692) as recited in the instant invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to obtain fine pearlite grain size (or be called pearlite blocks), for example, less than 10 μm as demonstrated in US'692 in the process of US'056 in view of US'759 in order to improve drawability of the steel wire (Col.3, line 15-27 of US'692).

Response to Arguments

Applicant's arguments filed on 8/17/2009 with respect to claims 1-3, 5, 6, and 8-18 have been fully considered but they are not persuasive. The arguments respectively related to the amended features, the Examiner's position has stated as above.

Applicant's arguments are summarized as follows:

1, Regarding the term of "consisting essentially of" in the instant claims 1, 3, 5, 6, 8, 10-13, and 15-17, the transitional phrase "consisting essentially of" should be construed as just that, rather than construe more broadly as "comprising".

2, Minami (NPL-1) discloses a one-step cooling process that contrasts to two-step cooling in the instant invention, and Minami does not disclose the mechanical properties as recited in the instant invention.

3) "close to" is not the proper standard with respect to alleging a prima facie case of obviousness (See MPEP 2144.05). The determination of optimum values outside that range may not be obvious.

4, Applicants again point out *In re Sebek* (465 F.2d 902, 175 USPQ 93, 95 (CCPA 1972)) which stands for the principle that where the prior art disclosure suggests the outer limits of the general range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum should be sought within that range (i.e. the examples), the determination of optimum values outside that range may not be obvious.

5, A standard deviation is not able to be determined from a single data point (i.e. the only example disclosed). Accordingly, the office action has failed to show that Kuroda et al (US'056) discloses or suggests the 4 claimed mechanical properties of the steel wire rope.

Responses are as follows:

Regarding the argument 1, because all the basic composition ranges and optional elements ranges disclosed by US'056 overlap the composition ranges of the instant claims 1 and 18, the alloy of US'056 meets the limitation of "consisting essentially of" as recited in the instant claims 1 and 18. Regarding the limitation of "consisting essentially of" in the instant claims 8, 10-13, and 15-17, the Applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention. In re De Lajarte, 337 F.2d 870, 143 USPQ 256 (CCPA 1964). See MPEP 2111.03. In the instant case, the applicant has not provided evidence to show that the introduction of the additional binder material, for example B 0.001 to 0.005wt% would materially change the characteristics of applicant's invention.

Regarding the argument 2, the Examiner notes that the cooling process of Minami's Fig.2 (NPL-1) includes not just Loop conveyer 8, it also includes cooling zones 4 and 6, which reads on the two or more steps cooling process as recited in the instant invention. NPL-1 teaches tensile strength, reducing area, deviation of tensile strength, and deviation of reducing area (Table 4, 6, Fig.7-9 of NPL-1), which reads on the corresponding limitations in the instant claims.

Regarding the argument 3, MPEP 2144.05 I clear teaches: Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of "having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.). MPEP 2144.05 I. The applicant must "show that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range," *In re woodcritical* 9 F.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir, 1990).

Regarding the argument 4, the Examiner notes the general teaching for the composition ranges of US'056's alloy overlaps all the composition ranges of the instant invention, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. US'056 teaches a rolled spring steel superior in workability with tensile strength less or equal to 1200 MPa (Abstract and Fig. 1 of US'056) and reduction area from 30% to 70%, which overlaps the claimed tensile strength range (912-1300(\pm 30) MPa) and reduction area (more than 35%) in the instant invention. The Examiner notes that the Applicants have not provided any convinced data to prove the criticality in the instant remark. For overcoming a prima facie case of obviousness by showing improved performance in a range that is within overlap with a range disclosed in the prior art, the applicant must "show that the [claimed] range is critical, generally by showing that the claimed range

achieves unexpected results relative to the prior art range," In re woocritical 9 F.2nd 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir,1990).

Regarding the argument 5, the Applicants should provide persuasive evidence to show that it is impossible to obtain standard deviation data from the the measurement of Kuroda et al (US'056).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/528,263

Page 17

Art Unit: 1793

JY

/Roy King/

Supervisory Patent Examiner, Art Unit 1793